XLVII. *Remarks on the Mutations of the Stars*; *by* Tho. Barker, *Eſq*; *of* Lyndon, *in* Rutland: *Communicated by the Rev.* W. Stukeley, *M. D. F. R. S.*

Read Jan. 31, 1760.

IT is well known there have been ſeveral alterations among the fixed ſtars: for inſtance, Ptolemy's *ultima fluvii*, a firſt magnitude ſtar, is in Dr. Halley's catalogue of the ſouthern conſtellations only a third magnitude: and in much leſs time, the δ of the Great Bear, which Bayer ſeems to have judged juſt of the ſame ſize with the other ſix, is grown far duller than any of them. Some ſtars alſo have quite diſappeared, while again new ones, not ſeen before, have been diſcovered: and there are others periodically larger and ſmaller. Two very remarkably bright, yet ſhort-lived, ſtars, have been alſo ſeen, one in Caſſiopeia, the other in Serpentarius; which breaking out, at once, with greater luſtre than any other fixed ſtar, gradually faded, and changing to different colours, in about a year and half were no longer viſible. But, I think, no one has yet remarked, that any laſting ſtar was of a different colour in different ages: Greaves, on the contrary, takes notice, that the colours of the ſtars and planets are the ſame now as the antients obſerved; which is, I believe, very true in general: for Ptolemy, in his catalogue of ſtars, ſays, Arcturus, Aldebaran, Pollux, Cor Scorpii, and Orion's Shoulder (with another to be mentioned preſently), are ὑπο-πυῤῥος, reddiſh: and the five here mentioned are ſtill of

of that colour, and, I think, the only conſiderable ſtars which are ſo.

But, to this rule there ſeems to be one exception, and that in a remarkable ſtar: for old authors mention the Dog ſtar, which is now white, and not at all inclined to redneſs, as being then very much ſo; as in the following places:

Τοιος και φρθρος αειρομενω ὑπο νωτω
Φαινεται αμφοτεροισι κυων ὑπο ποσσι βεβηκως
Ποικιλος——— Αρατ. φαινομενα. 326.

Which Cicero thus turns——See Gruter's Cicero, IV. 359

Namque pedes ſubter rutilo cum lumine claret
Fervidus ille Canis ſtellarum luce refulgens.
Seu rubra Canicula findet
Infantes ſtatuas—— *Hor. Sat.* II. 5, 39.

Acrior ſit Caniculæ rubor, Martis remiſſior Jovis nullus. *Seneca Quæſt. Nat.* I. 1.

Ὁ εν τω ϛοματι λαμπροτατος καλουμενος κυων ὑποκιρρος. *Ptolemy.* Κυνος ἀϛερισμος.

Ποικιλος, in the quotation from Aratus, does not expreſly mean red; but is always uſed of ſomething ſhewy, glittering as gold, various-coloured, &c. as in the following places.

Τειχεα ποικελα χαλκω. *Homer's Il.* γ. 181.
Παρδαλεη μεν πρωτα μεταφρενον· ευρι καλυψε
Ποικιλη——— Ιλ. κ. 30.
Ὁς καλλιϛος εην ποικιλμασιν—— Οδ. ο. 107.
Βητην εις Οδυσηα δαιφρονα ποικιλομητην. Οδ. χ. 202.

Aratus therefore, I think, ſhews at leaſt, that the Dog ſtar was not then of the ſame colour as other ſtars: and, as Cicero turns it *rutilus*, it appears he either underſtood the word to mean red, or knowing by his own view it was ſo, thought it the proper interpretation; for *rutilus* is uſed of what is reddiſh, and often of the red glare of a fire, or the dawn, as below:

——rutilum vomit ille cruorem. *Ovid. Met.* V. 33.

Promiſſæ et rutilatæ comæ. *Livy.* XXXVIII. 17.

Arma inter nubem, cœli in regione ſerena.
Virg. Æneid. VIII. 528.

Per ſudum rutilare vident,
Sin maculæ incipient rutilo immiſcerier igni.
Georg. I. 454.

Auroram rutilare procul cerno.
Varro, de Ling. Lat. VI. 5.

Rubra, in Horace, will, I think, bear no other ſenſe than red, or elſe it is the heat he there chiefly ſpeaks of: and though, I think, Latin authors confound *Canicula*, ſome uſing the word for *Sirius*, others for Procyon; yet it plainly appears, that *Sirius* is here meant, ſince Horace always calls it *Canicula*, and never uſes the word *Sirius*: but Aratus and Ptolemy leave no room to doubt what ſtar it was, being expreſly ſpeaking about the Dog ſtar.

Seneca ſays, the redneſs was ſo ſtrong as to exceed that of Mars, to which no ſtar now approaches. None of the notes on Seneca clear up this matter: Fromondus, indeed, obſerved the place, and declared his aſtoniſhment at it; but does not attempt

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to ſolve the difficulty. Ptolemy's is, however, the moſt undeniable evidence, who, when directly deſcribing the ſtars, and particularly mentioning the Dog ſtar, ſays, expreſly, it was of the ſame colour as Cor Scorpii, and the other ſtars, which are ſtill red; ſo that I do not ſee how his evidence can be diſputed.

There is, however, one objection to what I have ſaid, but I, think, not an unanſwerable one; which is, that, at firſt ſight, Hyginus ſeems to call Sirius white: but ſince, if ſo, he contradicts the other authors I have above quoted to prove it red, and, becauſe he there ſays ſomething I do not well underſtand, I ſhall quote the whole.

Hygini Poetic Aſtron. II. 35.

Canis habet in lingua ſtellam unam, quæ ipſa Canis appellatur; in capite autem alteram, quam Iſis ſuo nomine ſtatuiſſe exiſtimatur, et Sirion appellaſſe propter flammæ candorem; quod ejuſmodi ſit, ut præter cæteras lucere videatur, itaque quo magis eam cognoſcerent, Sirion appellaſſe.

He again diſtinguiſhes theſe two ſtars, *lib.* III. 34.

Canis habet in lingua ſtellam unam, quæ Canis appellatur, in capite autem alteram, quam nonnulli Sirion appellant, de quo prius diximus.

Of two ſtars in the Dog's head, Iſis and Sirius, Eratoſthenes alſo ſpeaks:

Καταστερισμος λγ. Κυων —— Εχει δε αστερας, επι μεν της κεφαλης ὰ ὁς Ισις λεγεται, της γλοττης ὰ ὁν και Σειρων καλεσι μεγας δε εστε ϗ λαμπρος, τες δε τοιετες

ἀστέρας οἱ ἀστρολογοι σείριδας καλεσι διὰ την της φλογος κινησιν.

Hyginus, in diſtinguiſhing Canis from Sirius as two different ſtars, ſeems, to me, to contradict all other writers, who ſpeak of them as one, except, perhaps, two or three latter ones, who directly quote Hyginus's words. Sirius, or Canis, the brighteſt ſtar in the heavens, is that, which Ptolemy calls in the mouth; Eratoſthenes and Hyginus, in the tongue: but whether Bayer γ, which Flamſtead calls a third magnitude ſtar, Ptolemy only a fourth, was in more antient times larger, I will not pretend to ſay; ſince, Eratoſthenes and Hyginus both ſpeak of two ſtars in the Dog's head, as thought worthy of particular names. If, in Hyginus, *flammæ candorem* means the whiteneſs of its light, as *candor* often does, he expreſly contradicts what I have quoted above from others; yet ſtill I think Ptolemy's authority is greater than that of Hyginus. But that *candor* is alſo uſed for innocence, beauty, brightneſs, *&c.* take the following examples.

Bis ſenis equis candore eximio trahentibus. *Suet. Cæſ. Octav.* 94.

Si tamen ille prior, quo me ſine crimine geſſi
Candor——— *Ovid. Epiſt.* IV. 31.

——— formæ niſi candor. *Metam.* I. 743.

Candore noto reddas judicium peto.
Phædrus. III. *Prol.* 64.

Pendebant ex auribus inſignes candore et magnitudine Lapilli. *Quint. Curt.* IX. 4.

Ut cum videmus ſpeciem primum, candoremque cœli. *Cic. Tuſc. Quæſt.* I. 28.

Solis candor illuſtrior quam ullus ignis. *De Nat. Deor.* II. 15.

In the ſecond or third laſt quotation, *candor* is uſed in the ſame ſenſe as in Hyginus, for brightneſs, without regard to colour; for ſo, I think, he muſt be underſtood, not only to avoid contradiction between him and Ptolemy, but from the name *Sirius*, which it could not be called from its whiteneſs, Σειριος bearing no relation to that, but to brightneſs, heat, or dryneſs; all which the antients ſpeak of, as properties of the Dog ſtar. Again, it is brightneſs, wherein it excells all other ſtars, and not in whiteneſs; for Orion's foot and others are as white, but there is none ſo bright as the Dog ſtar. All this is ſaid, on ſuppoſition there was but one remarkable ſtar in the Dog's head, that in the mouth: for if there were two, as Hyginus ſays, we are not here concerned with either the brightneſs or colour of his *Sirion*, which was in the head, as it certainly faded before Ptolemy's time, who mentions only one, that in the mouth, and which, he ſays, was then red, but is now white.

To conclude the whole; however remarkable and without precedent it may be, that ſo noted and laſting a ſtar as the Great Dog ſhould have changed its colour, yet as at leaſt five different writers affirm it, ſome ſo expreſly, and where their ſubject required them to ſpeak particularly about it, it appears to me to have been certainly the caſe. If, however, any one, ſtartled at the ſtrangeneſs of the thing, thinks

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the evidence I have brought inſufficient to prove it, he is deſired to invalidate what I have here ſaid, by a deduction of freſh evidence, and to account for theſe ſeveral expreſſions in old authors, which ſeem to prove, that ſuch a change has really happened.

XLVIII. *The Method of making Sal Ammoniac in* Egypt; *as communicated by Dr.* Linnæus, *from his Pupil Dr.* Haſſelquiſt, *who had been lately in thoſe Parts: By* John Ellis, *Eſq*; *F. R. S.*

Read Jan. 31, 1760.

SAL Ammoniac is made from the ſoot ariſing from the burnt dung of four-footed animals, that feed only on vegetables.

This dung is collected in the four firſt months of the year, when all their cattle, ſuch as oxen, cows, buffaloes, camels, ſheep, goats, horſes, and aſſes, feed on freſh ſpring graſs, which, in Egypt, is a kind of trefoil, or clover: for when they are obliged to feed their cattle on hay, and their camels on bruiſed date kernels, their excrements are not fit for this purpoſe; but when they feed on graſs, the poor people of Egypt are very careful to collect the dung quite freſh, and, for that purpoſe, follow the cattle all day long, in order to collect it as it falls from them; and, if it is too moiſt, they mix it with chaff, ſtubble, ſhort ſtraw, or duſt, and make it up in the form of cakes, about the ſame ſize and ſhape as it lies on the ground.

Then